

REMARKS

Claims 24-26 and 28-44 were pending in this application when the present Office Action was mailed (August 31, 2006). In this response, claims 24 and 25 have been amended, and claim 46 has been added. Accordingly, claims 24-26, 28-44, and 46 are currently pending in this application.

In the August 31, 2006 Office Action, all of the pending claims were rejected. More specifically, the status of this application in light of the Office Action is as follows:

(A) Claims 25 and 26 stand rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement;

(B) Claims 24-26 and 28-44 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite;

(C) Claims 24, 26, 33, 37, 41, and 42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,906,857 to McKee et al. ("McKee") in view of U.S. Patent No. 6,255,156 to Forbes et al. ("Forbes");

(D) Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over McKee in view of Forbes and further in view of U.S. Patent No. 5,882,773 to Chow et al. ("Chow");

(E) Claims 24, 28-30, and 32-44 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,505,986 to Velthaus et al. ("Velthaus") in view of McKee and Forbes;

(F) Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Velthaus in view of McKee and Forbes and further in view of U.S. Patent No. 5,242,709 to Chaffin, III ("Chaffin"); and

(G) Claims 30, 31, 38, and 39 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Velthaus in view of McKee and Forbes and further in view of U.S. Patent No. 4,857,802 to Fuyama et al. ("Fuyama").

As a preliminary matter, the undersigned attorney wishes to thank the Examiner for engaging in a telephone interview on January 24, 2007. During the telephone interview, the Examiner and the undersigned attorney discussed the claimed invention and the teachings in McKee though no agreement was reached regarding the pending Section 103 rejections. The following remarks reflect the foregoing discussion and expand upon the points discussed during the January 24 telephone interview. As a result, the applicant requests that this paper also constitute the applicant's Interview Summary. If the Examiner notices any deficiencies in this regard, the Examiner is encouraged to contact the undersigned attorney.

A. Response to the Section 112, first paragraph, Rejection

Claims 25 and 26 were rejected under 35 U.S.C. § 112, first paragraph, as allegedly failing to comply with the written description requirement. Claim 25 has been amended to eliminate the phrase on which the rejection is based. Claim 26 depends from claim 25. As a result, the Section 112, first paragraph, rejections of claims 25 and 26 should be withdrawn.

B. Response to the Section 112, second paragraph, Rejection

Claims 24-26 and 28-44 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Claim 24 has been amended to replace the phrase "adjacent to said substrate" with the phrase "closer to said substrate than to said first and second sources." Support for the amendment can be found at page 8, line 34, page 9, lines 1-4, and Figure 1 of the specification as filed. In particular, the specification discloses that the "location of [the] crystal rate monitors 16 and 22 [is] spaced from [the] source materials 12 and 14 but close to [the] substrate 18" to more accurately monitor the deposition of the

source materials 12 and 14 onto the substrate 18. (Specification at page 9, lines 2-4, emphasis added). The crystal rate monitors 16 and 22 are further disclosed as being "as near as is practical" to the substrate 18. (Specification at page 9, line 1). Furthermore, Figure 1 clearly shows the crystal rate monitors 16 and 22 positioned close to the substrate 18 than to the sources materials 12 and 14. As a result, one skilled in the art would understand that the specification discloses positioning the crystal rate monitors 16 and 22 closer to the substrate 18 than to the source materials 12 and 14. For at least the reasons discussed above, the specification as filed supports the features of claim 1, including positioning coating rate monitors "closer to said substrate than to said first and second sources." Accordingly, the Section 112, second paragraph, rejections of claims 24-26 and 28-44 should be withdrawn.

C. Response to the Section 103 Rejection on the Basis of McKee and Forbes

Claims 24, 26, 33, 37, 41, and 42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McKee in view of Forbes. Without commenting on or conceding the merits of the Examiner's position, independent claim 24 has been amended to further clarify the claimed subject matter. For the reasons discussed below, the combined teachings in McKee and Forbes do not support Section 103 rejections of these claims.

Claim 24 is directed to a method for the deposition of a thin film of a pre-determined composition onto a substrate comprising a ternary, quaternary or higher composition. The method includes placing a first deposit at a first source of a vapour deposition apparatus and placing a second deposit at a second source of the vapour deposition apparatus. The first and second deposits are different components of the pre-determined composition. The method also includes placing first and second coating rate monitors closer to the substrate than to the first and second sources. The first coating rate monitor is shielded from deposition from the second source but open to deposition from the first source, and the second coating rate monitor is shielded from deposition from the first source but open to deposition from the second source. The method further includes simultaneously

effecting vapour deposition of the components from the first and second deposits onto the substrate and the first and second coating rate monitors. Rates of deposition of the components onto the first and second coating rate monitors are independently measured. Temporal variation of the deposition of the components is determined based on the independently measured rates of deposition. Stoichiometry of the vaporized components is controlled using the temporal variation of the deposition of the components as feedback to ensure constant deposition on the first and second coating rate monitors, thereby obtaining a continuous homogeneous temporal deposition of the composition on the substrate.

McKee discloses controlling material deposition from effusion cell assemblies using shutters. (Abstract). During deposition, a deposition rate monitor 84 is positioned inside one of the effusion cell assemblies 26, 28, or 30 and behind shutters 60, 62 for monitoring the rate of vaporization from the source 46 of the effusion cell assembly. (Column 6, lines 1-6). The monitors are used to determine how long the shutters for the sources should be left open to cause a burst of evaporant to be emitted from the source. (Column 10, 42-46). The pulses of evaporant with a controlled mass from the sources are sequentially deposited onto the substrate 18 to form a laminated film on the substrate 18. (Column 9, lines 15-21).

Forbes discloses a method for forming a porous silicon dioxide insulator having a low relative dielectric constant of about 2.0 or less from a silicon carbide base layer. (Abstract). During manufacturing, a mixture of gases can be used in a chemical vapor deposition process to form a silicon carbide layer on the substrate. (Column 5, lines 64-66). The flow rates of the gases are adjusted to provide silicon carbide of the desired stoichiometry. (Column 6, line 1).

The combined teachings of McKee and Forbes do not support a Section 103 rejection of claim 24 because the combined teachings fail to teach or suggest several features of this claim. For example, the combined teachings do not teach or suggest

"placing first and second coating rate monitors closer to said substrate than to said first and second sources." Instead, assuming McKee's deposition rate monitor 84 corresponds at least in part to the first or second coating rate monitor of claim 24, McKee's deposition rate monitor 84 is positioned inside the effusion cell and behind the shutters 60, 62. The effusion cells are positioned in the bottom of the deposition chamber and facing the substrate positioned at the top of the deposition chamber. Thus, the deposition rate monitor 84 is closer to the source of the effusion cell assembly than to the substrate.

Forbes discloses that a chemical vapor deposition process can be used to form a silicon carbide layer on the substrate. Forbes fails to disclose the details of how the process is performed. Accordingly, even taken together, McKee and Forbes fail to disclose the features of claim 24.

Further, neither McKee nor Forbes provide any suggestion to combine the teachings of these references because McKee and Forbes are designed to produce different deposition results. McKee discloses that the effusion cell assemblies 26, 28, and 30 can be advantageously used to control the emission of an evaporant to the substrate 18 in an alternating fashion such that a compound is deposited on the substrate 18 in a layered formation. For example, the deposition on the substrate 18 can be a multilayer alloy ABC_2 having a layered arrangement of A/C/B/C/A/C/B/C. (McKee at Column 9, lines 15-28). Thus, the deposited layer of McKee is heterogeneous in an atomic scale. Contrarily, Forbes discloses forming a uniform silicon carbide layer on the substrate, so the deposited layer is homogenous. As a result, one skilled in the art would not be motivated to combine McKee with Forbes because such a combination would not yield a desired deposition result.

As the combined teachings of McKee and Forbes fail to teach or suggest each and every limitation of claim 24 and there is no suggestion to combine the reference teachings, the combined teachings of McKee and Forbes do not support a Section 103 rejection of claim 24. Claims 26, 33, 37, 41, and 42 depend from claim 24. Accordingly, the Section

103 rejections of these claims should be withdrawn for the foregoing reasons discussed above and for the additional features of these dependent claims.

D. Response to the Section 103 Rejection on the Basis of McKee, Forbes, and Chow

Claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over McKee in view of Forbes and further in view of Chow. As discussed above, the combined teachings of McKee and Forbes fail to teach or suggest each and every limitation of claim 24. Chow was cited for the disclosure of measuring deposition rates using crystal rate monitors. As a result, even assuming Chow discloses this subject matter, Chow fails to cure the deficiencies of McKee and Forbes as establishing a *prima facie* basis for rejecting claim 25 under Section 103. Accordingly, for at least the foregoing reasons, the combined teachings of McKee, Forbes, and Chow do not support a Section 103 rejection of claim 25, and the Section 103 rejection of claim 25 should be withdrawn.

E. Response to the Section 103 Rejection on the Basis of Velthaus, McKee and Forbes

Claims 24, 28-30, and 32-44 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Velthaus in view of McKee and Forbes. As discussed above, the combined teachings of McKee and Forbes fail to teach or suggest each and every limitation of claim 24. Velthaus was cited for the disclosure of a method for depositing a thin film of pre-determined composition onto a substrate. As a result, even assuming Velthaus discloses this subject matter, Velthaus fails to cure the deficiencies of McKee and Forbes as establishing a *prima facie* basis for rejecting claims 24, 28-30, and 32-44 under Section 103. Accordingly, for at least the foregoing reasons, the combined teachings of Velthaus, McKee, and Forbes do not support Section 103 rejections of claims 24, 28-30, and 32-44, and the Section 103 rejections of these claims should be withdrawn.

F. Response to the Section 103 Rejection on the Basis of Velthaus, McKee, Forbes, and Chaffin

Claim 25 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Velthaus in view of McKee and Forbes and further in view of Chaffin. As discussed above, the combined teachings of Velthaus, McKee and Forbes fail to teach or suggest each and every limitation of claim 24. Chaffin was cited for the disclosure of using a crystal rate monitor in depositing a phosphor film. As a result, even assuming Chaffin discloses this subject matter, Chaffin fails to cure the deficiencies of Velthaus, McKee and Forbes as establishing a *prima facie* basis for rejecting claim 25 under Section 103. Accordingly, for at least the foregoing reasons, the combined teachings of Velthaus, McKee, Forbes, and Chaffin do not support a Section 103 rejection of claim 25, and the Section 103 rejection of claim 25 should be withdrawn.

G. Response to the Section 103 Rejection on the Basis of Velthaus, McKee, Forbes, and Fuyama

Claims 30, 31, 38, and 39 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Velthaus in view of McKee and Forbes and further in view of Fuyama. As discussed above, the combined teachings of Velthaus, McKee and Forbes fail to teach or suggest each and every limitation of claim 24. Fuyama was cited for the disclosure of sputtering a thin film EL element onto a substrate. As a result, even assuming Fuyama discloses this subject matter, Fuyama fails to cure the deficiencies of Velthaus, McKee and Forbes as establishing a *prima facie* basis for rejecting claims 30, 31, 38, and 39 under Section 103. Accordingly, for at least the foregoing reasons, the combined teachings of Velthaus, McKee, Forbes, and Fuyama do not support a Section 103 rejections of claims 30, 31, 38, and 39, and the Section 103 rejections of these claims should be withdrawn.

H. Newly Added Claim

Claim 46 has been added in this response. Claim 46 is patentable over the cited references for including a combination of features neither taught nor suggested by the

cited references. For example, none of the cited references disclose or suggest, alone or in combination, "forming a homogeneous layer of said composition on the substrate by controlling stoichiometry of said vaporized components using the independently measured rates of deposition of said components onto the first and second crystal rate monitors as feedback."

I. Conclusion

In view of the foregoing, the claims pending in the application comply with the requirements of 35 U.S.C. § 112 and patentably define over the applied art. A Notice of Allowance is, therefore, respectfully requested. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned representative at (206) 359-6038.

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Respectfully submitted,

By 

Chen Liang

Registration No.: 51,945

PERKINS COIE LLP

P.O. Box 1247

Seattle, Washington 98111-1247

(206) 359-8000

(206) 359-7198 (Fax)

Attorney for Applicant